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Implementation towards IoT Based Management System for Smart Campus

Aditya Shelke, Pratik Borhade, Saurabh Dhakane, Prachi Bambere, Dr. R. S. Bhosale

Department of Information Technology, AVCOE, Ahmednagar, Maharashtra, India

Department of Information Technology, AVCOE, Ahmednagar, Maharashtra, India

Department of Information Technology, AVCOE, Ahmednagar, Maharashtra, India

Department of Information Technology, AVCOE, Ahmednagar, Maharashtra, India

Department of Information Technology, AVCOE, Ahmednagar, Maharashtra, India

ABSTRACT: Smart Campus is a combination of technology and traditional campus where Student academic attendance and otherfacilities in campus are very important since it will affect the students from gaining knowledge and skills as well as their grades. We propose a smart campus where we use IoT based Attendance of students and Library management of books . We further use this knowledge to create the prediction model for performance analysis of students. We have used RFID technology to maintain attendance of students and same for management of books in library.RFID tags and reader capture data on server. The system uses machine learning for data from attendance to predict the performance of students in last semester. machine learing model of SVM is used for prediction and give analysison result of students.

KEYWORDS: IoT, RFID, SVM, Smart Campus, Library Management

I. INTRODUCTION

Student academic attendance is very important since it will affect the students from gaining knowledge and skillsas well as their grades. This project has related about thestudent attendance system through the matching of RFID to confirm their attendance. The main purpose of carrying out this project is to develop a hybrid student attendance system for which application is developed to obtain the attendance of student by RFID and post/review the attendance results using web-based student attendance system. So, RFID attendance system can be known as the best authentication to detect the individual student attendance record. In addition, accordingto the technology nowadays, it is not unusual anymore to take the attendance of students through their tags. Nowadays, most universities and colleges are still using the traditional attendance system which requires student to sign on a pieceof paper every time they attend a class throughout the whole semester. Using the traditional attendance system, we can obviously see that there are few problems such as it will beno backup for the attendance records once the lecturer acci- dentally lost the attendance sheet, course mate help those who did not attend the class sign the attendance which also known as buddy-signing as well, hard in analyzing and tracking student performances based on attendance factor, student lack of knowledge and skills due to the poor attendance in attendingclasses, and etc. It is important to overcome these problems since it will help in improving the academic performance of students as well as the teaching environment of the lecturers. Hence, the purpose of carrying out this project is to prevent unwanted situation occur and to find out the problems that causes these problems as well as find the solutions to overcomethese problems.

Thus, through the problems analyzed, the objective of this project is to develop a RFID student attendance system in recording their attendance effectively in every class in order to prevent student skip classes. Next, the developed system will provide the report generation regarding to the studentattendance in order to assist the lecturer/staff in analyze and tracking student attendance. By implementing the developed system, lecturers will no more facing the empty classroom every time while they are lecturing in front the stage. Other than that, student will not be able to ask their buddy to signfor them anymore since the system requires their tags to prove their attendance in the class. In addition, it will be easierto evaluate and analyze the student performance based ontheir attendance since the system will record the attendance more accurately and efficiently with minimum possible error. Furthermore, student academic performance will increase as well since they cannot fake their attendance through the developed system which means they have to attend all the classes in order to prevent them from get bar.

Paper is organized as follows. Section II describes about the related work done earlier for the system to be developed. Section III presents method used and algorithms used for the detection. Section IV presents experimental results showing results of images tested. Finally, Section V presents conclusion.

II. RELATED WORK

1. **An attendance system design based on RFID tech- nology**
   The system used Arduino, MRFC522 and WIFI to design the network card reader. The system stored data through Access database, and designed the upper computer program by the LabVIEW 2016. The system realized the record, query and background management of staff attendance data[1].
2. **IoT based Smart Attendance Monitoring System using RFID**
   The proposed attendance monitoring system uses the concept of IoT to log and fetch data on the server/cloud and make it available for the user anytime and any- where[2].
3. **Research and Application of RFID Technology inSmart Campus**
   Using RFIDis Safer at front end as back end.Authors used utility to find lost card with unique Id[3].
4. **A New Mutual Authentication Protocol in MobileRFID for Smart Campus**
   It implements mutual authentication among the backenddatabase, the tag and the reader, so that it can better resist tracking, forgery, replaying attacks, MTM attacks,de-synchronization attacks and DoS attacks, etc[4]

III. PROPOSED METHODOLOGY

System Architecture
examples to one category or the other, making it a non- probabilistic binary linear classifier.
•   An SVM model is a representation of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible.
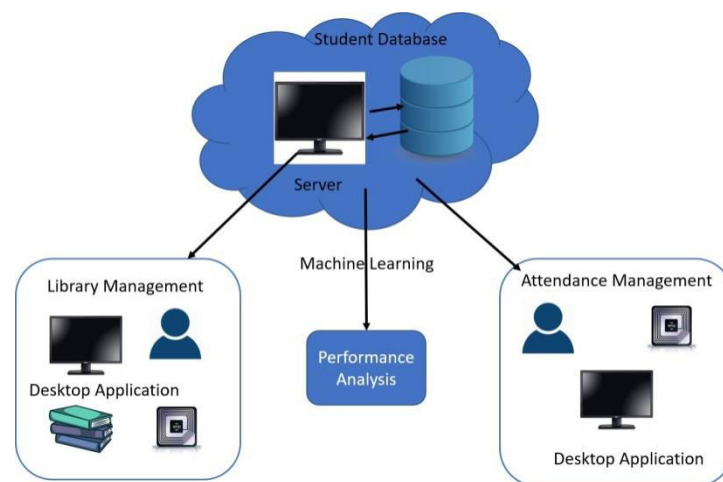

Fig. 1. System Architecture

A.   Algorithm

Input: D dataset, on-demand features, aggregation-based features,

Output: Classification of Application

for each application App-id in D do

Get on-demand features and stored on vector x for App-id

x.add (Get-Features(app-id));

end for

for each application in x vector do

Fetch first feature and stored in b, and other features in w.

hw,b (x) = g (z) here z= (wT x + b)

if (z 0)

assign g(z)=1;

else g(z)=-1;

end if

end for

Fig. 2. SVM

B.   Modules

1)   Admin:
-Admin in the system involve issuing the RFID. -The Admin adds Staff Members. -Staff member is given authority to add students. -Attendance system and Li- brary Management and Result Predction System are maintained by Admin.

2)   Student Attendance :
-Involves RFID reader placed at classroom entrances - When student is in classroom it detect students through their smart cards and marks their attendance at starting of lectures and end of lectures to avoid the frauds. - The system flags errors if it detects more than one attendance on the card.

3)   Library Management System
-Each book in the library will be fitted with RFID tags eliminating the need to manually check-in and checkout books and monitor the library inventory. - When students leave the library, the RFID tags on the

1) SVM: SVM (Support vector machine) is one popular algorithm used for many classification problems.

•   It is one of the supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Given a set of training examples, each marked as belonging to one or the other of two categories,an SVM training algorithm builds a model that assigns new books are matched with their campus cards, which are then recorded in the system. The RFID reader at the library entrance responds to borrowing limits and shuts the gates. Overdue books are charged on the student prepaid cards.

4)   Performance Analysis
-Performance Analysis of a student is predicted with help of earlier evaluation and attendance marked and extracurricular activities which is performed by students.

-Performance Analysis involves use of machine learning to predict the next/last semester performance with data from previous all semesters.

C.   Hardware
1)   Arduino: NodeMCU is an open source firmware for which open source prototyping board designs are available. The name "NodeMCU" combines "node" and "MCU" (micro- controller unit). The term "NodeMCU" strictly speaking refers to the firmware rather than the associated development kits.Both the firmware and prototyping board designs are open source.The firmware uses the Lua scripting language. The firmware is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS Due to resourceconstraints, users need to select the modules relevant for their project and build a firmware tailored to their needs. Support for the 32-bit ESP32 has also been implemented.

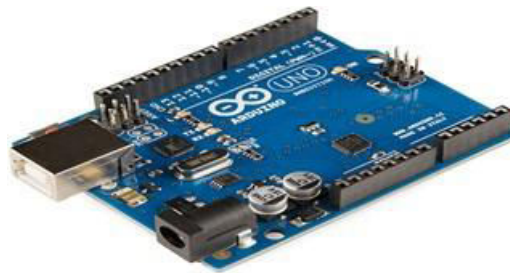## IV. RESULT & DISCUSSIONS

Fig. 5. Cover Page

Fig. 3. Arduino

2)   *RFID:* The decision tree Algorithm belongs to the family of supervised machine learning algorithms. It can be used for both a classification problem as well as for regressionproblem
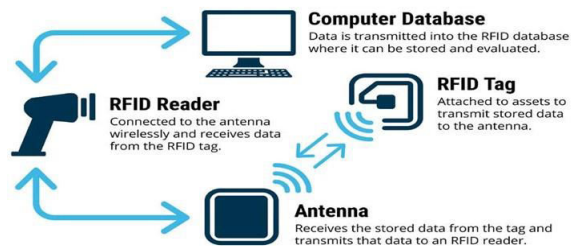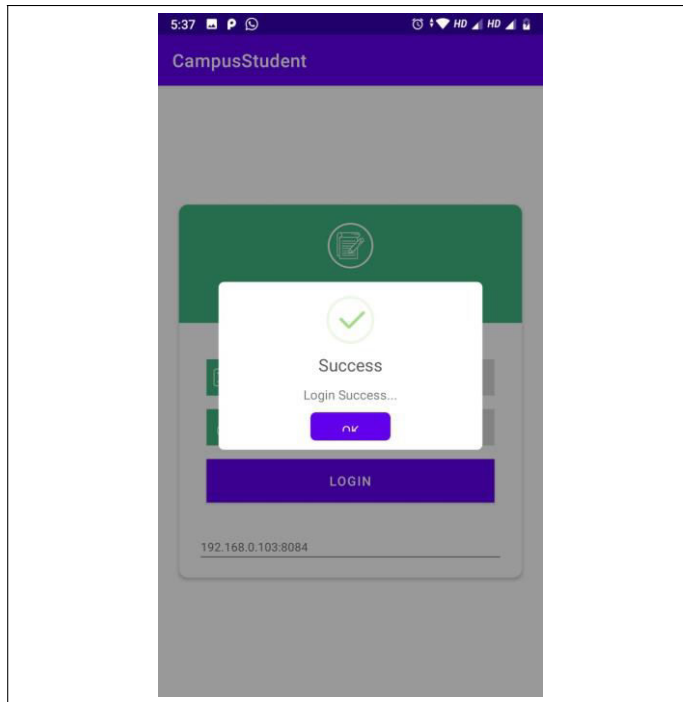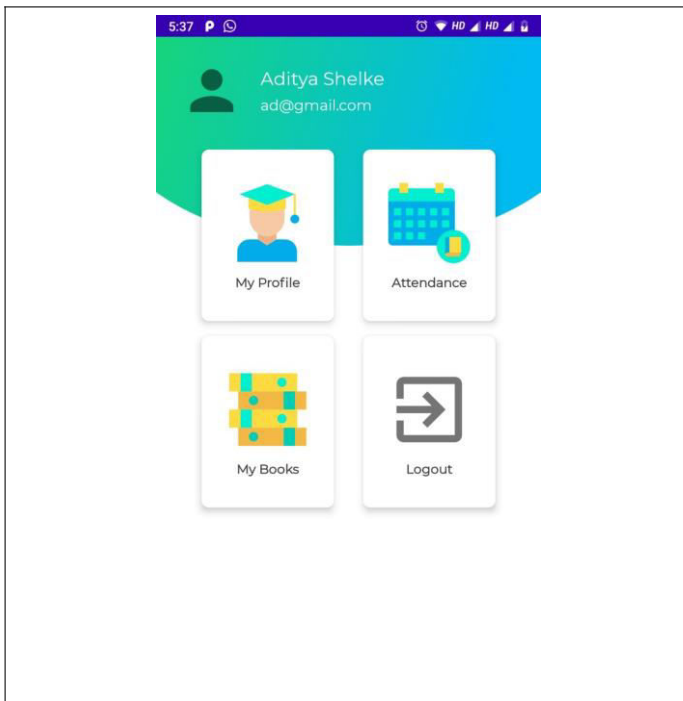

Fig. 4. RFID

Fig. 6. Successful Login
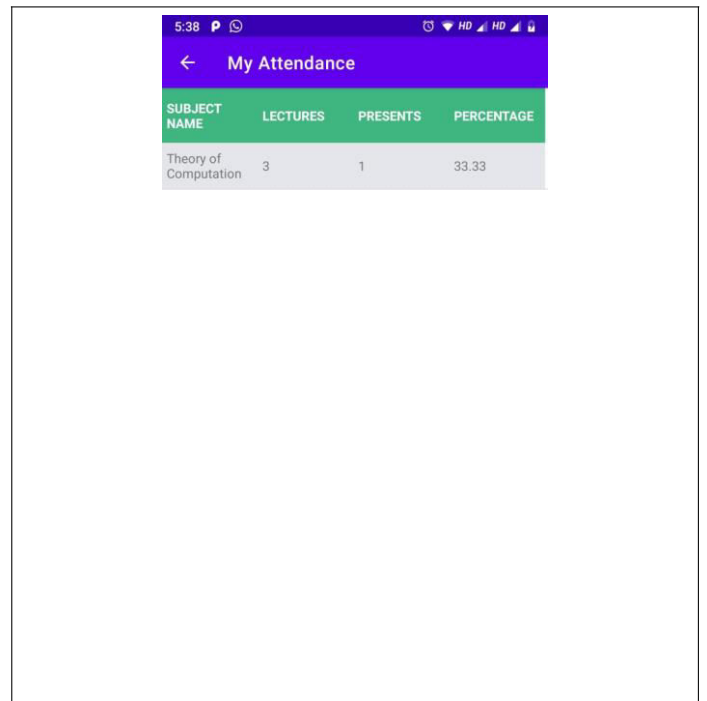

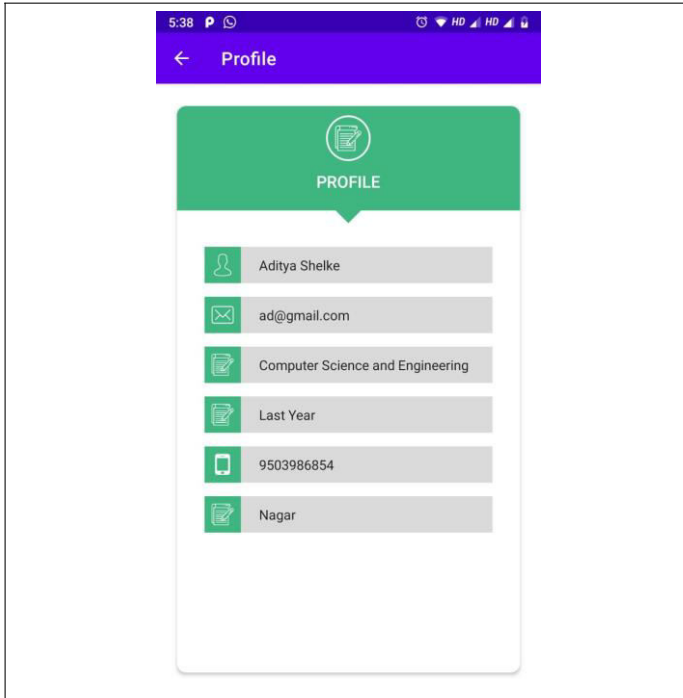Fig. 7. Student Dashboard

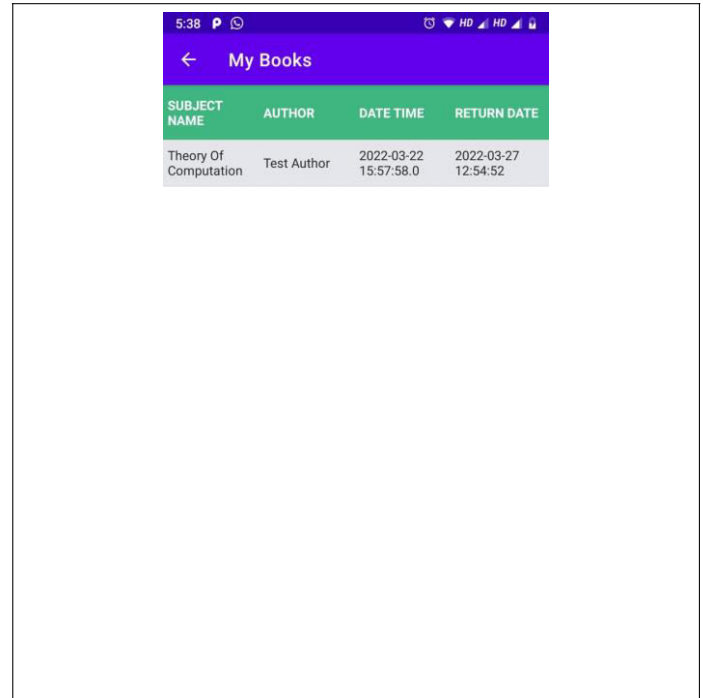Fig. 9. Student Attendence

Fig. 8. Student Profile
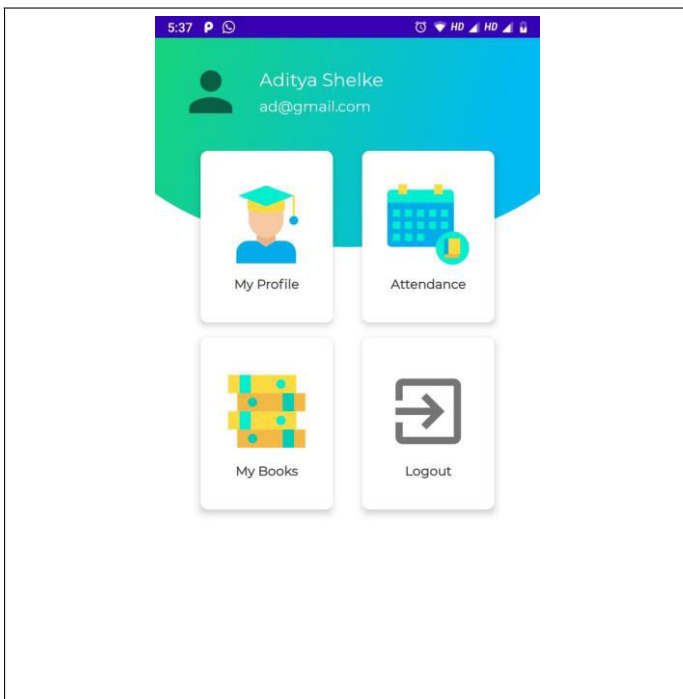

Fig. 10. Student Library Records
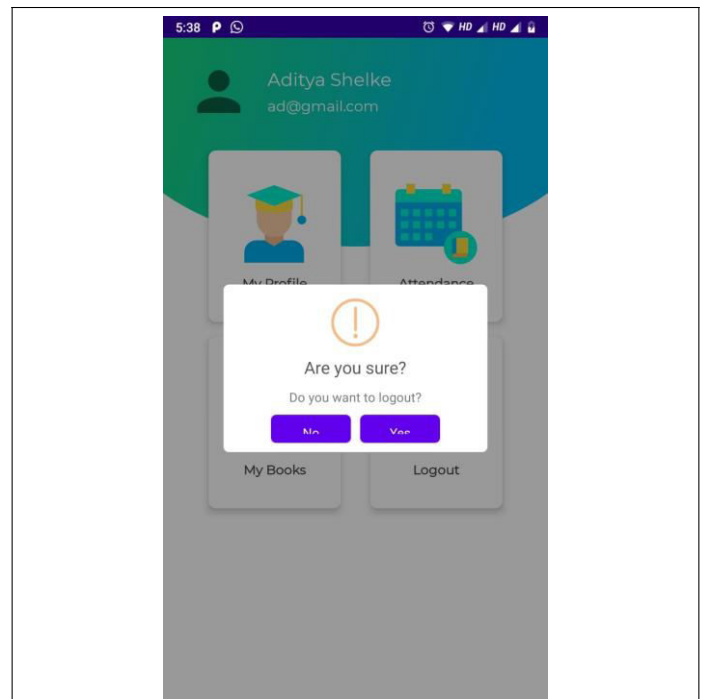

Fig. 11. Student Dashboard

Fig. 12. Logout

V. CONCLUSION

System is developed as an IoT Based Smart Campus with hybrid approach of Management of Attendance and Library Books Issued by Students.The Student Attendance Manage- ment System is developed using Android Studio fully

meets the objectives of the system which it has been developed. The system is operated at a high level of efficiency and all the teachers and user associated with the system understands its advantage. A fair and unbiased performance evaluation systemis needed for promoting education and to achieve learning out-come. Proposed method is very helpful in evaluating subjectivetypes of answer paper. Our system considers many aspects of student's participation, not only grades got on exam marks ina formative way. Proposed system provides a smarter, fairer, transparent way to evaluate student performance.

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📱 9940 572 462 🟢 6381 907 438 ✉ ijircce@gmail.com

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